DOCUMENT RESUME

ED 273 788 CE 044 964

AUTHOR	Stasz, Cathleen
TITLE	Electronic Tools and Job Design.
INSTITUTION	Rand Corp., Santa Monica, Calif.
PUB DATE	Feb 86
NOTE	12p.; Paper presented at the Joint National ORSA/TIMS Meeting (Atlanta, GA, November 4-6, 1985).
AVAILABLE FROM	Rand Corporation, 1700 Main Street, P.O. Box 2138, Santa Monica, CA 90406-2138 ($4.00; 25% discount on 25 or more).
PUB TYPE	Reports - Research/Technical (143) -- Speeches/Conference Papers (150)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Business; Clerical Occupations; *Clerical Workers; *Computer Oriented Programs; *Computers; *Information Technology; *Job Development; Professional Occupations; *Professional Personnel

ABSTRACT

A first step toward thinking about job design issues involves consideration of three questions. They are (1) what kinds of changes occur when electronic tools are adopted in the workplace?, (2) whose jobs change and how?, and (3) who plays a role in job design? Answers can be drawn from data and observations from two Rand Corporation studies concerning the implementation of information technology in the workplace. Managers report moderate or major changes in 72 percent of the work groups who acquire electronic tools. Managers frequently mention changes in performance standards and job titles and descriptions. Generally, clerical jobs are upgraded and given titles reflecting new job responsibilities. Few changes are found in professional jobs despite drastic changes in how a job is done. Managers play the most important role in redesigning clerical jobs. In contrast, professional jobs are redesigned by the individual involved. Reasons for these patterns are that not all organizations accept responsibility for employee adaptation to technological change; due to the unionization of many clerical jobs, formal changes are more likely to occur in clerical than professional jobs; managers manage clerical and professional workers differently; and managers often have a narrow view of the technology. (YLB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED273788

ELECTRONIC TOOLS AND JOB DESIGN

Cathleen Stasz

February 1986

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

E Kurkjian

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

CE044964

P-7193

The Rand Paper Series

Papers are issued by The Rand Corporation as a service to its professional staff. Their purpose is to facilitate the exchange of ideas among those who share the author's research interests; Papers are not reports prepared in fulfillment of Rand's contracts or grants. Views expressed in a Paper are the author's own and are not necessarily shared by Rand or its research sponsors.

The Rand Corporation, 1700 Main Street, P.O. Box 2138, Santa Monica, CA 90406-2138

ELECTRONIC TOOLS AND JOB DESIGN*

Cathleen Stasz
The Rand Corporation

INTRODUCTION

The introduction of computers into office work significantly increases the amount of time users spend in essentially technical activities, such as maintaining databases, training others in computer use, and devising and learning new applications. Although programming ability is not required for many advanced office uses, future users will still spend a great deal of time learning to use their electronic tools and becoming more sophisticated in their use. This raises a number of questions relevant to job design. Does this mean that the user is now more skilled or that the nature of the job has changed? If so, should these changes be reflected in job descriptions and levels (and, by implication, pay or promotion)? Or is it more appropriate to view the job as essentially unchanged, and computer users as performing the same function with different tools?

This paper does not attempt to answer these questions. Rather, it focuses on three other questions as a first step toward thinking about job design issues: (1) What kinds of changes occur when electronic tools are adopted in the workplace? (2) Whose jobs change and how? and (3) Who plays a role in job design?

---

*This paper was presented at the joint national ORSA/TIMS meeting, held in Atlanta from November 4-6, 1985. This paper benefited from conversations with Tora K. Bikson, Barbara Gutek and Roy F. Zerner. The paper draws on research funded by the National Science Foundation and by the Office of Technology Assessment. The views expressed here, however, are the author's own and are not necessarily shared by these organizations or by the Rand Corporation.

OVERVIEW OF RESEARCH

To answer these questions, we draw on data and observations from two studies conducted at Rand--both concern the implementation of information technology in the workplace. Brief descriptions of the research follow. (For more detailed accounts of this research see Bikson and Gutek, 1983; Bikson, Stasz, and Mankin, 1985).

The first study, sponsored by the National Science Foundation, includes 26 organizations, comprising 55 departments or work groups and 530 employees. One-quarter of these work groups are managerial. Twenty-nine percent are text-oriented professionals, whose major products are text-bearing documents. Another 20 percent are technical professionals, whose products take the form of specifications, formulas, designs, and the like. The remaining 27 percent of the groups provide clerical, secretarial, or technical support.

The second study, funded by the Office of Technology Assessment, is a case study of a successful implementation in the corporate headquarters of a mid-size manufacturing firm. In Company XYZ four work groups are studied--market research, financial control, planning, and product development in R&D--and we look at managerial, professional, and clerical jobs within each. In addition, we investigate a number of jobs whose work interacts with these departments.

In both of these studies we're looking at organizations or work groups within organizations that are early adopters of information technology. Many have quite sophisticated state-of-the-art systems and a wide range of hardware and software applications.

REPORTED CHANGES IN WORK GROUPS

How much change do managers see in jobs that acquire electronic tools? As can be seen in Table 1, our interview data indicate that managers report moderate or major changes in 72 percent of the work groups. These groups had been using electronic tools for at least six months.

Computers affect work group activity by increasing skill levels, creating more task variety, and increasing employee satisfaction. On the other hand, feedback, pace, and job-related stress remain about the

Table 1

REPORTED CHANGES IN THE NATURE OF THE WORK GROUP

	Percent
No Changes	12
Small Changes	16
Moderate Changes	37
Major Changes	35

Table 2

COMPUTER-RELATED EFFECTS ON WORK GROUP ACTIVITY

	Percent Reporting		
	More	Same	Less
Skill Level	54	44	2
Task Variety	54	35	11
Task Feedback	38	60	2
Pace Fluctuation	25	56	19
Stress	24	57	19
Satisfaction	76	11	13

same (see Table 2). Of those sites reporting changes, a number of types are noted. Over half of the managers mention changes in performance standards--typically, they expect more and better work in less time. In about a third of the groups, job changes produce changes in job titles and descriptions. Changes in official personnel requirements (e.g., whether new employees in the work group must have computer skills) are less frequently cited, as are changes in salaries (see Table 3).

Table 3

COMPUTER-RELATED EFFECTS ON JOBS IN THE WORK GROUPS

	Percent of Sites Reporting Changes
Performance Standards	52
Job Titles	33
Job Descriptions	33
Personnel Requirements	25
Pay Levels	20

WHOSE JOBS CHANGE AND HOW

When we look more closely at these overall changes in work groups, we find a number of interesting differences between clerical and professional jobs in the changes that actually take place. Generally, clerical jobs are upgraded and given titles such as "department assistant," "computer specialist," or "research assistant," that reflect new job responsibilities. New responsibilities often include tasks like information management, or responsibilities shift from data entry tasks to data cleaning and preliminary analysis.

Some of these title changes are accompanied by higher salaries and a new career path. These types of changes, however, come later than actual performance changes.

Although we see a reduction in clerical jobs, fewer jobs disappeared than we expected, on the basis of projections in the literature. Instead, managers try new alternatives for handling clerical work. For example, one department manager upgraded his three clerical workers to technical assistants and hired a part-time Kelly employee to do the few remaining clerical tasks.

On the other hand, we find few changes in professional jobs despite drastic changes in how a job is done. Across the board, professional workers say they can do more and better work in less time. However,

few take on new job-related responsibilities. They use the time saved to accomplish tasks they didn't have time to do before, or to perform technical tasks, such as updating their databases and managing their files.

Many computer users take on responsibilities *not* related to their regular job. Local experts emerge. The local expert might be a market analyst, a commodity specialist, or a sales and distribution planner, who gets heavily involved in the technology, usually out of personal interest. As a result, these individuals assume a second job. They write programs for their department, help their peers, and train new employees. This occurs even though expertise is available elsewhere--e.g., from a vendor or the in-house business systems department. Local experts thrive, however, because other employees think they are better than the designated "technical" people. This isn't surprising, of course, because the local expert understands the nature of the group's work; the technical person typically does not.

Furthermore, changes in one work group inevitably affects others. The R&D department of one company, for example, has an interactive program that optimizes product formulas using a database that includes information about products, ingredients, costs, and the like. In a few hours an analyst can determine if a good buy on the commodity market can be used in their product line in a cost-effective manner. Before the new technology, this determination could take four or five days. The ability to make a decision in such a short time totally changed the behavior of the buyers in the company's commercial department.

WHO PLAYS A ROLE IN JOB DESIGN?

For the most part, managers play the most important role in redesigning clerical-level jobs when these changes occur. They usually do this in spite of personnel departments. For most, it is an uphill battle trying to convince higher-ups of the need to make a title and/or salary change. Although three-quarters of the organizations in the study have human resource or personnel departments, only 12 percent play a role in the implementation process. They typically do not get involved in training employees to use a new technology, or in retraining them as information systems change.

In contrast, professional jobs are redesigned by the individual involved. We saw job redefinition and invention, and, as mentioned earlier, emergence of local expertise. Local experts take on technical support and training functions in addition to their official job. For the most part, management just lets this happen. There is an expectation that if you have good people and give them good tools they will do good work. Management intervenes only when there is a problem--for example, if too many requests for help prevent the local expert from getting his or her regular job done. We were surprised at this free-wheeling approach; we expected that more attention would be paid to these kinds of job changes and their impact on work groups and the organization.

WHY DO THESE PATTERNS EMERGE?

We offer a number of explanations for these results. First, that there are few across-the-board changes in pay levels and promotions may be due to the fact that not all organizations accept responsibility for employee adaptation to technological change. Thirty-six percent of the managers in our study think it is not the organization's problem. Thirty percent think it is a short-term problem. Only a third believe there is a continuing role for the organization in this area.

The finding that formal changes are more likely to occur in clerical than professional jobs may be due, in part, to the unionization of many clerical jobs. Unions act as watchdogs and spokespersons for their workers; one of their jobs is to identify and rectify harmful or potentially harmful working conditions. As a result, organizations like "9 to 5" are vocal about possible harmful effects of video display terminals and the routinization of work when technology is improperly introduced into clerical jobs. And there is concern that the technology will ultimately replace clerical jobs. As a result, organizations and managers are more aware of and perhaps feel they need to be more sensitive to the reactions of clerical workers than professionals. Similarly, most research has focused on investigating these emerging "problems" in clerical occupations; little research has asked how technology impacts the work of professionals and managers.

Third, managers manage clerical and professional workers differently. Generally, jobs further down the organizational ladder are more likely to be supervised. Clerical workers and secretaries are hired for the skills they possess, such as typing. Their job is to support professionals, and their work can be organized into manageable tasks. Professionals, on the other hand, are hired to accomplish objectives. They bring more general skills to a job and are given freedom to accomplish it in different ways, as long as they produce the desired outcomes. The process by which they accomplish their job is not highly supervised or scrutinized.

Finally, managers often have a narrow view of the technology. The manager of a planning department, for example, may have a number of subordinates who specialize in areas like sales and distribution, materials, and business operations. While each of these individuals may use electronic tools to analyze data or make forecasts, few managers have hands-on experience. They may know the models, data structures, and logic of the information system relevant to the work of their department; but they probably lack knowledge of how the operation of these systems influences the flow of work, the users' ability to solve a problem, and the expertise required to use the tool effectively. Without such knowledge, job changes can hardly be recognized let alone managed. Similarly, the manager's working knowledge of systems is typically department-specific; few have a larger understanding of how different systems are integrated to accomplish broader organizational functions. Many managers are uncomfortable with this situation, and they are unsure of how to resolve it.

CONCLUSIONS

We draw two conclusions from the research presented in this paper. The first is methodological in nature. In all of our research on information technology, we focus on the work group as the primary unit of analysis for understanding the transition to computer-based information tools. This makes sense for a lot of reasons. Organizations are actually structured into work groups, and decisions about what hardware and software tools are needed cannot be made apart

from understanding the type of work unit in which they will be used. Electronic tools may be given to individuals, but they are not used in isolation. Job changes in one group are likely to affect changes in other jobs both within the group and in other groups. Thus, it is necessary to view the job and the technology in context--to identify the links between jobs, work groups, and the larger organization. While traditional organizational research that gathers data across job strata may reveal information about job changes of the kind described in this paper, that method will not shed light on broader issues, such as why human resource departments don't play a larger role in implementation. We require a paradigm--a complex, structured model of work in organizations--that enables us to explore these links.

From a managerial perspective, our research indicates that the ability to manage change is vital. Organizations are slow to change, and it's hard to anticipate the kinds of changes that might occur when electronic tools are implemented. Organizations that equate good management with stasis are always behind the game. The technology is always changing. And even if it weren't, there isn't any system that can be bought, plugged in, and managed in the traditional sense. Instead, organizations need to adopt positive change management under conditions of uncertainty. Although there are few models to follow, we have observed some organizations whose implementation strategies resulted in successful outcomes.

In one organization, for example, there was no "post implementation" period. Rather, the information system continues to change and individuals keep finding new ways of working with it. New ways of working, in turn, generate needs for new system modifications or extensions, and so on. Instead of trying artificially to impose a steady state on the implementation process, this organization attempts to understand how innovation progresses. Rather than minimize change, the organization learns to manage it. We believe that effective change management will enable organizations to achieve the positive impacts that electronic tools can have on individual jobs and on the work of the organization. More research is needed to provide useful paradigms for implementing information technology in the workplace.

REFERENCES

Bikson, T. K., and B. A. Gutek, *Advanced Office Systems: An Empirical Look at Utilization and Satisfaction*, The Rand Corporation, N-1970-NSF, 1983.

Bikson, T. K., C. Stasz, and D. A. Mankin, *Computer-Mediated Work: Individual and Organizational Impact in One Corporate Headquarters*, The Rand Corporation, R-3308-OTA, 1985.